

Opportunistic Environmental Biomonitoring The NYC HANES Experience

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NHANES

- The National Center for Health Statistics (NCHS) has conducted National Health and Nutrition Examination Survey (NHANES) for over 30 years
- NHANES provides important public health information at the national level
- No similar entity exists at local or state levels

NYC HANES Objectives

- Estimate prevalence of selected diseases, risk factors & environmental exposures in NYC
- Evaluate whether appropriate treatments, controls are being offered / utilized?
- Examine differences across demographic subgroups

EPHT Objectives

- Improve EH surveillance
- Increase NYC tracking systems compatibility
- Evaluate linkages among surveillance, exposure and health outcome data
- Priority areas: heavy metals, housing conditions, pesticides

NYS Biomonitoring Program Objectives

- Increase NYSDOH laboratory capacity for measurement of environmental chemicals in human specimens (e.g., blood, urine, saliva)
- Address environmental health questions important to NYS through collaborative investigations

DIVISION OF ENVIRONMENTAL DISEASE PREVENTION

New York State Biomonitoring Program Plan

Biomonitoring Planning Program



Expanding New York State laboratory capacity to assess exposure to environmental toxicants...



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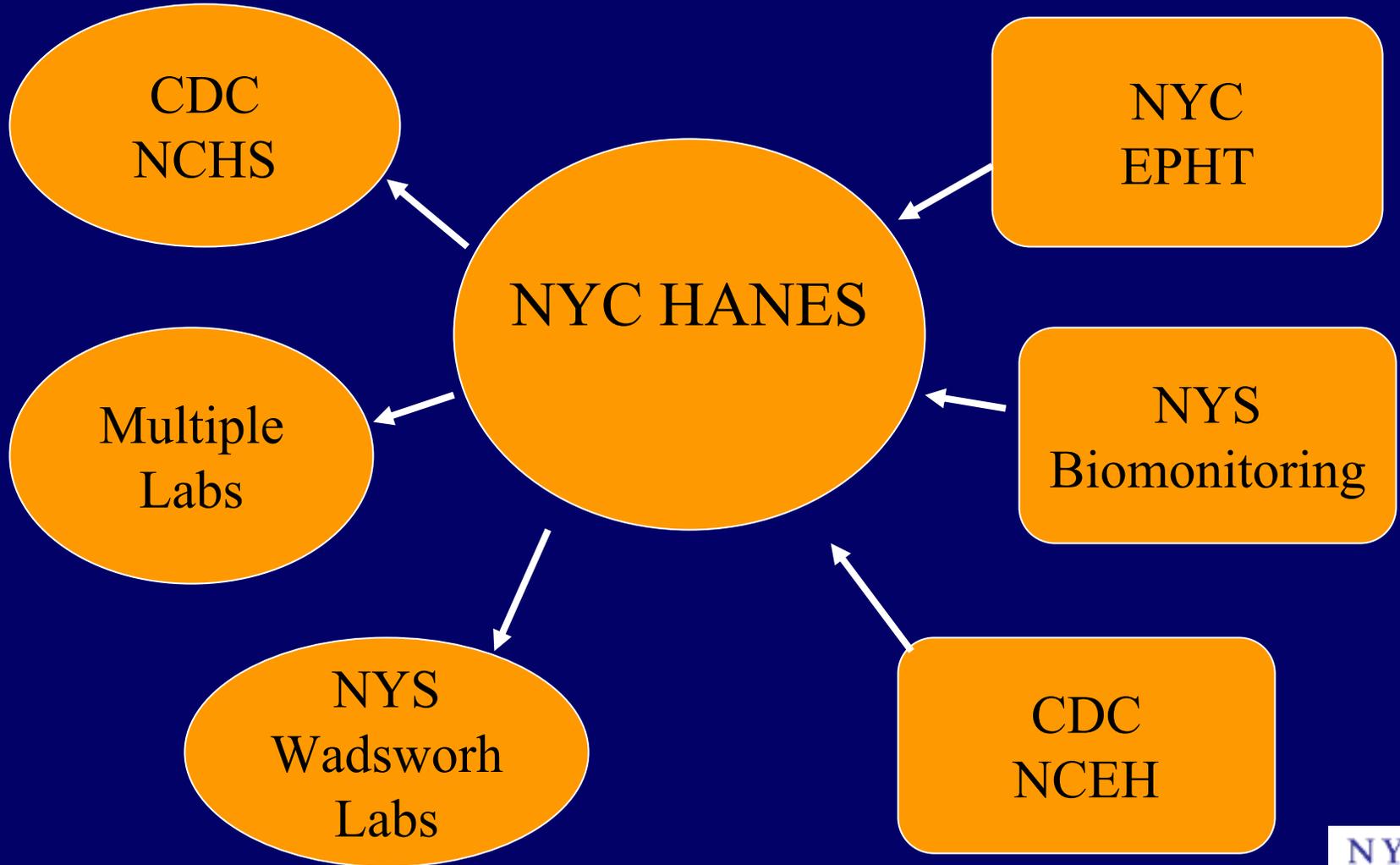
NYC HANES = Opportunity for Improving Environmental Exposure Surveillance

Funding Sources

\$ - City Tax Levy =



\$ - Grant & In-Kind =



NYC HANES

- Population-based, cross-sectional study of NYC residents
- Non-institutional adult population, 20 years of age and older
- N = 2,000 NYC residents across all 5 boroughs

NYC HANES

- Three-stage probability sampling design
 - Census segments (block or block group)
 - Households
 - 1 or 2 adult Study Participants (SPs)
- No oversampling of demographic subgroups will be conducted
- Field interviewers will identify SPs
- SPs will go to 1 of 4 examination “stands” for interview, examination, and urine and blood collection

Traditional HANES Interview, Examination and Laboratory Analyses Components in NYC HANES

Interview:

Health Conditions

- Weight History
- Physical Activity
- Smoking & Tobacco
- Drug Abuse
- Mental Health Conditions

- Exposures

- Income, Occupation
- Immunization
- Access to Care
- Sexual Behavior
- Social Support

Examination:

- Blood Pressure
- Anthropometry
- Venipuncture & Urine Collection

Laboratory Analyses:

- Blood Lipid Profile
- Fasting plasma glucose
- Glycohemoglobin
- Hepatitis C virus
- Herpes simplex 1 & 2

NYC HANES Environmental Components

Interview: Exposures

- Fish and organic food consumption
- Personal and professional pesticide use
- Tobacco exposure (direct and second-hand)

Laboratory Analyses:

- Heavy Metals – Hg, Pb, Cd (blood)
- Heavy Metals and trace elements + arsenic (urine)
- Pesticides (urine)
- Cotinine (blood)

Sample Repository

- NYC HANES will establish a population-based serologic & urine repository to explore emerging public health issues
- For each SP, ~3 mL sera and 20 mL urine will be stored in specimen bank for future research
- Intra- and extramural research proposals may be submitted to use specimens
- Proposals will be reviewed for scientific merit and compliance with human subjects and ethical standards

NHANES: Environmental

- **NHANES 1999 data**
 - **First-time pesticides analyses included organo-phosphate metabolites**
 - **Included trace & heavy metals & cotinine**
- **NHANES 1999 – 2000**
 - Selected organo-phosphates
 - Organochlorines
 - Carbamates
 - Herbicides
 - Pest repellents & disinfectants
 - (pyrethroids not included in public report)



NYCHANES

Environmental Plan

Why Metals, Pesticides and Cotinine?

- Scope of problem for NYC
 - Extensive use of pesticides & tobacco
 - Lead poisoning still significant among young children; less known about extent among adults
- Analyzable
 - Existence of bio-assays
- Exposure data limited
 - Anecdotal reports of mercury use for cultural purposes
 - Unknown frequency of fish consumption
 - No exposure data on pesticides

NYCHANES

Environmental Plan

- Serum Cotinine
 - Study population = all 2000 SPs eligible
 - Estimate prevalence of tobacco use & exposures (ETS)
 - Look at relationships between use/exposure and chronic health conditions, biochemical measurements

NYCHANES

Environmental Plan

- Metals
 - Study population = urine collected for all 2000 SPs; women of childbearing age (20-49 yrs) n = 400-500 for blood and for first-stage analyses

Blood

- Heavy metals: mercury, lead, cadmium

Urine

- Trace elements (includes heavy metals): 12 NHANES plus arsenic

NYCHANES

Environmental Plan

- Pesticides
 - Study population = urines collected for all 2000 SPs; random sampling for n = 400 samples for first-stage analysis
 - Organophosphates
 - Four metabolites (urine)
 - Pyrethroids
 - Five metabolites (urine)

NYC HANES

Resources

- Staffing
 - 3 Full-time NYCHANES
 - 30-40 NYCDOHMH staff for field study period
- Costs
 - CDC Contract: approximately \$1 million
 - Staffing overtime costs
 - In-kind support: clinics, NYC PH Lab, CDC NCEH Laboratory
 - Environmental costs:
 - \$90,000 – cotinine @ ~ \$50.00 / sample
 - \$32,000 – blood metals @ \$70.00/sample

Report of Findings: SPs

- Indicators of serious health problems are reported as soon as detected
 - Blood pressure
 - BMI
 - Undiagnosed/poorly controlled diabetes
 - Herpes
 - Hepatitis C
 - Mercury, lead, cadmium and arsenic
- Routine reports of other results of clinical interest are provided when complete

Report of Findings: Others

- State and City reporting requirements will be followed
- Public summary reports including report on environmental biomonitoring results
- No reports for some environmental components (pesticides, trace elements)
- Scientific reports / journal articles

NYC HANES Schedule

- December 2002, initiated discussions with NCHS regarding NYC HANES
- April 2003, planning process began
- June 2003, NYCDOHMH contracted with NCHS
- March 2004, pilot testing
- June – Sept. 2004, conduct survey

Conclusions

- Overlapping program goals
- Collaboration leverages funds
- Benefits inter / intra-agency working relationships
- Environmental components inexpensive relative to total HANES costs
- Local HANES – treasure trove for exposure data

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New York City HANES Team